

IN THE TITLE AND SPECIFICATION:

Amend the title on the first line of page 1; amend the paragraphs that begin on page 5, line 24; page 9, line 4; and page 11, lines 7, 13 and 22.

Change the title as follows:

RHYTHM IDENTIFICATION IN COMPRESSION CORRUPTED ECG
SIGNAL ~~ECG FOR RESUSCITATION~~

Paragraph beginning on page 5, line 24:

Fig. 1 illustrates a victim V who has signs of cardiac arrest and who is being treated by a rescuer C. The rescuer may be a person who is a bystander and who has taken a CPR course. The rescuer has applied the electrodes of an AED (automatic external defibrillator) 14 that was available at the site of possible cardiac arrest, and is performing chest compressions at the lower chest area 12. The automatic defibrillator 14 can apply high-voltage (e.g. 2,800 volts) shocks when the intelligence built into the defibrillator confirms the presence of a rhythm that prompts delivery of an electrical shock. The defibrillator has a cable 16 with wires 20, 22 having conductors that are connected to first and second electrodes 24, 26. The electrodes are attached to the skin of the victim at conventional locations under the right collar bone and left lower chest. The rescuer applies downward forces or compressions to the sternum. It is noted that in some cases a rescuer also may blow air into the mouth or nose of the patient by mouth-to-mouth or mouth-to-nose breathing, sometimes using a mask or barrier device. An electrically insulating sheet 32 has been placed between the rescuer and the patient, so the rescuer can continue to apply chest compressions when the defibrillator delivers an electrical shock. As an option, the rescuer may be prompted prior to the delivery of a shock by the AED, and the rescuer may choose to stop chest compressions for a few seconds (generally less than 5 seconds) to allow for the shock to be applied.

Paragraph beginning on page 9, line 4:

Fig. 5 shows an ECG signal 70 from a patient whose heart is undergoing VF while chest compressions of an average amplitude G are being applied. The chest compression artifacts 82 can be removed by one of the processes described above. That is, the only periods analyzed are the periods B2 that extends 12.5% before and after each artifact 82. The ECG signal in periods B2 do not display any QRS complexes. That is, in the graph there are no sharp spikes between the compression artifacts, which indicates the presence of the bizarre VF condition characterized by the absence of QRS. This triggers delivery of a defibrillating shock. A large number (e.g. 60 consecutive B2 periods) of signals in periods B2 are analyzed to try to detect QRS complexes, to be sure that all QRS complexes do not happen to lie in the periods A2 of chest compressions.

Paragraph beginning on page 11, line 7:

Fig. 11 contains a graph 130 that is a raw ECG signal containing QRS complexes. Fig. 12 is a graph 132 that is a Wavelet Transform of Fig. 11. Fig. ~~43~~ 14 includes a set 134 of graphs obtained by following the same process described for Fig. 9. That is, applicant first takes spike regions for the seven largest peaks S11-S17 in Fig. 12. Each spike region includes a peak and the signal portion 0.2 second prior to and following the peak.

Paragraph beginning on page 11, line 13:

Fig. ~~14~~ 13 is a set 142 of graphs obtained by computing the autocorrelation of the seven spike regions of Fig. ~~43~~ 12 to obtain dark and thick line 144, and by computing the crosscorrelations of the seven spike areas to obtain the thin lines 151-157. The empty "white" space between the thick line 144 and each of the thin lines 151-157 is calculated, as the integral of the magnitude of the difference between the thick line and each thin line. If a small white area (an integral smaller than a preset amount) has been calculated for a thin line, this indicates a QRS

complex, while a large white area (an integral larger than the preset amount) indicates VF for that thin line.

Paragraph beginning on page 11, line 22:

A visual comparison of the crosscorrelations of Figs. 10 and ~~14~~ 13 shows that for the VF set 112 of Fig. 10 the thin lines 121-127 are largely out of phase with the thick line, which results in a large "white" area indicating VF. For the QRS complexes of Fig. ~~14~~ 13, the thin lines 151-157 are largely in phase with the thick line, especially near the center 110 of the thick line; this indicates a QRS complex. Actual computing of the "white" area between a thick and thin line in Figs. 10 and ~~14~~ 13 will show this difference.